A Simple Test on the Convergence of Social Security Transfer in OECD Countries

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The growing trend toward globalization not only has aggravated international competition but also has increased interdependence among countries, inducing the need for harmonization and convergence of socioeconomic policies across countries. This paper examines whether the convergence phenomenon holds for social security transfers as a percentage of GDP in OECD countries, applying the traditional methodology of σ- and β-convergence.

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I. Introduction

Since the late 20th century, the trend toward globalization has caused new waves for socioeconomic policies. The increase of globalization and competition among countries has arguably had a profound impact on the use of social protection, because globalization is normally accompanied by increases in income inequality, polarization and unemployment. Hence, governments of industrialized countries have established various types of welfare systems and actively intervened in the labor market so as to mitigate unemployment and income inequality. Consequently, the globalization trend worldwide has led to more active government intervention in social security and increased government budgets to finance this intervention (Rieger and Leibfried, 2003; Rodrik, 1998).

However, there is also a view that the globalization trend may lead to a reduction of social security transfers. The increase of international trade will require lower labor costs and export prices, which will lead to greater pressure to reduce taxes and welfare expenditures on social security.[1] In addition, drastic capital movements between countries will reinforce the need for 'social dumping.' Hence, globalization will turn existing welfare states into minimalist welfare states, where a 'race to the bottom' will be apparent (Castles, 2004; Rhodes, 1998).

The two arguments summarized above may seem contradictory but are really based on the same premise. That is, international competition will increase interdependence among countries, resulting in the stifling of a country's government spending while enforcing a degree of harmonization of tax policies. Therefore, the main purpose of our paper is to ask whether OECD countries demonstrate convergence in social security transfers. We use σ- and β-convergence methods to test for the existence of convergence.

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[1] Refer to Schulze and Ursprung (1999) for a summary of theoretical and empirical researches on this matter.

Castles (2004) presented a theoretical background to the convergence phenomenon of socioeconomic policies among European countries. Castles (2004) asserted that moves toward a unified market, tax harmonization and monetary union had a negative impact on government revenue[2] and social provision characterizing many European nations. That is, greater political competition will lead governments toward political integration or policy coordination as well as toward the convergence of socioeconomic policies. Castles (2004) also pointed out that these states are moving toward steady-state welfare states, not joining a 'race to the bottom.'

II. σ-convergence

To identify social security transfer convergence in OECD countries, we use data on social security transfers to measure σ- and β-convergence. These concepts are often used to determine the convergence or divergence of economic levels in the literature on empirical economic growth. First, σ-convergence of social security transfers in OECD countries can be determined by its standard deviation or variance.

In general, an international standard for the composition of government expenditure is the Classification of the Functions of Government (COFOG), which the UN established to create the System of National Accounts (the SNA). In the SNA 1986, COFOG is classified into 14 different areas while the SNA 1993 has 10 categories including general public services; defense; public safety and order; economic affairs; environment protection; housing and community amenities; health; recreation, culture and religion; education; and social protection.[3] The composition of government expenditure was not published in the transitional period between

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[2] Rodrik (1997) showed that globalization is related to reduction of tax revenues.

[3] According to the definition of SNA 1993, general government includes national, regional and local governments in addition to the social security fund.

SNA 1986 and SNA 1993.   This implies that it is difficult to acquire panel data on social security transfer measured by the same institution and the same method.

Fortunately, Bailey (2004) provided panel data for OECD countries over somewhat longer periods.   Bailey (2004) calculated social security transfers as a percentage of nominal GDP (denoted throughout as SSE) in 1960, 1968 and 1971–1999 using various statistics issued by the OECD.   That is, data on SSE consist of social security benefits, social security grants and unfunded employee welfare benefits paid by the general government.   Based on the data provided by Bailey (2004), the standard deviation of SSE among OECD countries is shown in Table 1.

[Table 1 around here]

In Table 1, we see that the standard deviation of SSE in the 22 OECD countries increased gradually after 1971, reached its peak of 5.26% in 1985 and then continually decreased.   This implies that the level of social security transfers in the 22 OECD countries has shown convergence since the mid-1980s.   In particular, the standard deviation of SSE in 1998 was sharply reduced to 3.60%.   This result may be related to the harmonization of socioeconomic policies among these 22 countries, as noted in Castles (2004).   In addition, it is easy to identity the similar pattern of σ-convergence in the 18 European countries, without the data on Australia, Canada, Japan and the USA.

III. β-convergence

β-convergence applies if a country with a lower level of social security transfers tends to catch up with a country with a higher level of social security transfers.   The β-convergence generally tends to generate σ-convergence, but this process is offset by new disturbances that

tend to increase dispersion (Barro and Sala-i-Martin, 2003).   Hence, these two concepts were separately considered in the existing literature on the existence of convergence or divergence of economic levels among countries.

Our paper also considers both σ- and β-convergence to examine whether SSE has converged in OECD countries.   To establish β-convergence, the growth rate of social security transfers (denoted throughout as GSSE) should be negatively and significantly related to the initial level of SSE.   GSSE can be defined with the following formula.

$$GSSE_{it} = \frac{SSE_{it} - SSE_{it-1}}{SSE_{it-1}} \times 100 \,.$$

Here, subscripts i and t denote countries and periods.   More specifically, the following equation based on the random effect model will be estimated.

$$GSSE_{it} = \alpha_0 + \alpha_1 SSE_{it} + \alpha_2 Log(PGDP)_{it} + \alpha_3 OAG_{it} + \alpha_4 SVA_{it}$$
$$+ \alpha_5 IOG_{it} + \alpha_6 UNE_{it} + v_{it}$$
$$v_{it} = \gamma_i + \varepsilon_{it}$$

Here, subscripts i and t of the dependent variable signify countries and the five periods (1975–80, 1980–85, 1985–91, 1991–95 and 1995–98).[4]   Meanwhile, subscripts i and t of the explanatory variables denote countries and the five years (1975, 1980, 1985, 1990 and 1995), α_0 is a constant, α_k (k = 1, 2, 3, 4, 5, 6) are the estimated coefficients of the corresponding explanatory variables, ε is an error term, and γ_i is an error term that represents country i's

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[4] For example, the GSSE for 1975–80 indicates the average growth rate of SSE for the period 1975–80. Although Bailey (2004) offers the data on 1990 and 1999, our paper uses data for 1991 and 1998 instead of those for 1990 and 1999 because the data on 1990 and 1999 were limited to only a few countries.

characteristics and does not change over time.

Let us note that the samples of countries used to measure σ- and β-convergence differ. The GSSE regression is based on 26 OECD countries (the sample in Table 1 plus Hungary, Korea, Mexico and Poland), but not all 26 countries' data are available for all periods.[5] This means that the GSSE regression uses unbalanced observations.

There are two typical models for the analysis of panel data. One is the fixed effect model, which uses a fixed average value of time series and cross-section characteristics. The other is the random effect model, which uses an error term for time series and cross-section characteristics. Generally, it is known that the GLS (generalized least squares) estimates using the random effect model are more efficient than within estimates using the fixed effect model for the quasi-asymptotic approach (N fixed T→∞ or T fixed N→∞) (Schmidt and Sickles, 1984). Therefore, the random effect model is more efficient for panel data with fewer periods as in this paper.

The explanatory variables used to estimate the above GSSE regression are as follows. SSE is social security transfers as a percentage of nominal GDP for the years (1975, 1980, 1985, 1991 and 1995), which is provided by Bailey (2004). In addition, the index of globalization (denoted throughout as IOG) is based on the 23 items related to economic, political and social integration. Data on IOG in 1975, 1980, 1985, 1990 and 1995 are taken from Dreher (2006), which provides a subjective classification of countries on a scale of 1 to 10, with lower ratings signifying less globalization.

It is worthwhile noting that the level of globalization of a country is traditionally measured by the extent of capital controls, openness to trade or the amount of foreign direct investment. However, these alternative proxy variables do not reflect the influence of political and social integration and their possible outcomes. For example, increased political integration makes it more difficult for transnational enterprises to comply with a country's regulations.

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[5] The reason is that some countries joined the OECD in mid-1990s.

The level of GDP per capita is estimated as purchasing power parity (denoted throughout as PGDP), and the ratio of population aged above 65 to total (denoted throughout as OAG), the ratio of the service industry's value added in GDP (denoted throughout as SVA), and the unemployment rate (denoted throughout as UNE) are included as explanatory variables.[6]   Data on such variables, for the same years as in the IOG, are taken from World Bank (2006).

Regression results on the β-convergence of social security transfers among OECD countries are summarized in Table 2.   Table 2 analyzes four different types of models to examine a multicollinearity problem that often arises in a cross-country analysis.   In addition, the total number of observations reduces to 74 in Model (D) when UNE is included as an explanatory variable.   The reason is that World Bank (2006) does not offer data on UNE in 1975.

[Table 2 around here]

We analyze whether β-convergence of SSE can effectively be identified by examining the estimated coefficient of SSE.   Regardless of the model specification, all estimated coefficients of SSE have statistically significant and negative signs, implying that β-convergence of SSE holds.   For example, an increase in SSE of a country by one standard deviation (about 4.09, the five years' average) is associated with an increase in the GSSE of about 7.57 percentage points, after accounting for the effects of other explanatory variables in Model (B).   In other words, the result indicates that a country with a low initial SSE level shows a large increase in GSSE, which demonstrates β-convergence of social security transfers in OECD countries.

Among other variables excluding SSE, the estimated coefficients of OAG and UNE show statistically significant positive and negative signs, respectively.   This implies that a country

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[6] Note that data on the PGDP are first-differenced, because the measures vary greatly across countries. Furthermore, the service industry includes all the services belonging to ISIC categories.

with a high proportion of aged population and a lower rate of unemployment may have a higher rate of growth of social security transfers. The sign of the UNE coefficient implies that the neglected class of people increases when UNE increases, and this gives rise to the need to increase the level of SSE, which negatively affects GSSE. However, the impacts of PGDP and SVA on GSSE provide little evidence.

Table 2 also indicates that the estimated coefficient of IOG depends on model specification. Although it is not apparent in Table 2, there exists a high correlation between IOG and SSE. This suggests that IOG is related to the level of social security transfers but has no statistically significant impact on its growth rate. In conclusion, both σ- (mid-1980s and beyond) and β-convergence of social security transfer are in effect in OECD countries.

IV. Conclusion

The worldwide trend toward globalization has increasingly required governments to play a larger role in the social security sector. Not only does it increase international competition but also it causes more interdependence and coordination of public polices. In other words, the globalization trend enlarges the role of government in social security transfers and gives rise to harmonization of the level of social security transfers among OECD countries.

This paper empirically examined whether social security transfer convergence holds, based on panel data in OECD countries. We have found that σ-convergence of social security transfers exists, as its standard deviation has shrunk among OECD countries since the mid-1980s. In addition, the initial level of social security transfers has a statistically significant and negative impact on the growth rate of social security transfers, leading to β-convergence of social security transfers. Therefore, we have shown that interdependence among OECD

countries due to globalization has influenced convergence of social security transfers.

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Table 1. Standard deviation of social security transfers among OECD countries

	1971	1975	1980	1985	1991	1995	1998
22 OECD countries	3.99	4.63	5.07	5.26	4.48	4.01	3.60
18 European OECD countries	3.86	4.69	5.03	5.25	4.43	3.95	3.54

Note: The countries in the sample are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK and USA.

Table 2. Estimated results on the β-convergence of social security transfers

Dependent variable: the growth rate of social security transfer (1975-80, 1980-85, 1985-91, 1991-95 and 1995-98)

	Model (A)	Model (B)	Model (C)	Model (D)
Constant	77.11 (3.55)***	81.40 (3.50)***	79.16(3.31)***	46.84(1.10)
SSE	-1.36 (-5.84)***	-1.85 (-5.07)***	-1.98(-5.36)***	-1.83(-4.64)***
Log(PGDP)	-5.49 (-2.34)**	-6.30 (-1.52)	-5.82(-1.40)	-0.23(-0.04)
OAG		2.12 (2.92)***	2.04(2.70)***	1.49(2.28)**
SVA		-0.30 (-0.87)	-0.47(-1.33)	-0.43(-0.96)
IOG			2.67(1.87)*	-0.59(-0.26)
UNE				-0.87(-1.84)*
R^2	0.21	0.26	0.28	0.33
Observations	110	110	110	74

Notes: (i) *t*-statistics are provided in parentheses. (ii) (***), (**), (*): significant at 1, 5, 10 percent levels, respectively.